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hot, kindles the gas which heated it, and this flame lights the wax taper *h*, which is stuck in a hole in the arm *i*; this hole is so much on one side of the jet as to let the wick only just touch the flame; the arm *i*, which holds the taper, is soldered to the brass neck *j* and to the tube *g*. Fig. 15 is a full-sized section of the tube *g*; within it slips a shorter ring of tube *k*, round the upper part of which the wire is twisted that holds the spongy platina; thus the platina, though hanging loose, is protected from accident, and is always opposite the jet.

No. II.

PURIFICATION OF LINSEED OIL.

The Silver Isis Medal and Ten Pounds were presented to Mr. Thomas Cogan, for his Method of Purifying Linseed Oil.

Of the seed-oils, those which are in the greatest demand are from rapeseed and from linseed. In France and in most other parts of continental Europe, rapeseed oil is that which is generally used for lamps; but it will not give a clear light till it has been freed from the mucilage and other matters which, when heated, become charred, and thus load the wick, and, by obstructing the capillary attraction, impair the free supply of oil. Acids, properly applied, will precipitate the mucilage; but long subsidence or tedious filtration are necessary for this purpose; and, after all, the oil is found still to retain some acid, or at least its properties have undergone some change, which diminishes its inflammability.

Linseed oil is not made use of in lamps; but there is an immense consumption of it as the basis of oil paints, both of those that are used in house-painting within doors, and of those that are employed by the artist. Linseed contains so much mucilage, that it is necessary to roast the seed more or less, in order to enable it to give out its oil to the action of the press; and on this account, the oil, which naturally has only a pale yellow colour, is generally reddish brown, from the previous toasting of the seeds, and still contains also a considerable proportion of mucilage. By separating from the oil this scorched mucilage, it is much improved as a vehicle for white and pale colours, and is also better able to resist the action of air and the weather.

M. Thénard was, it appears, the first who published a method of freeing the seed-oils from their mucilage, by the action of sulphuric acid; but the subsequent separation of the charred matter, by long standing, or by slow filtration, was a great objection to the process ; and the attempt to wash out the remains of the acid, by mechanical agitation of the oil with water, either cold or warm, was far from being fully successful.

Mr. Cogan's process, though resembling M. Thénard's in the first part of it, is completed by the judicious introduction of steam; by means of which the oil appears to be almost entirely freed from acid, and the black feculent dregs subside in the course of twelve hours, leaving the supernatant oil quite clear, and greatly improved in colour, and in those qualities for which it is valued by the painter.

The quantity of oil that he operates upon at once is about 100 gallons. For this, three quarts, that is about ten pounds, of sulphuric acid (oil of vitriol), is required. The acid is to be diluted with an equal bulk of water. The oil being put into a copper pan, of the shape of a boiler, two quarts of the dilute acid are to be added: the whole is then stirred up very carefully for an hour or more with a wooden scoop, till the acid has become completely incorporated with the oil, and the colour of this last has become much deeper than at first. A second similar quantity of acid is then to be added and mixed with the oil in the same way as the first was; and after this, the remaining third part of acid is to be added. The stirring of the oil is to continue incessantly for about six hours in the whole, at the end of which time the colour of the mixture will be almost that of tar. It is then to be allowed to stand quiet for a night, and in the morning is to be transferred to the boiler;—this is of copper, and has a steam-pipe entering it at the bottom, and then dividing into three or four branches, each of which terminates in a perforated plate. The steam, thus thrown in, passes in a very divided state into the oil, penetrates into every part of it, and heats it to the temperature of boiling water. The steaming process is to be continued for about six or seven hours, at the end of which time it is to be transferred to a cooler, of the form of an inverted cone, terminating in a short pipe, commanded by a stopcock, and also having a stopcock inserted in its side, a few inches from the bottom. After remaining a night in the cooler, the oil is fit to be withdrawn; for this purpose the cock at bottom is opened, and the black watery acid liquor flows out. As soon as the oil begins to come, the cock is closed, and that in the side of the cooler is opened. From this the oil runs quite clear and limpid;

the whole of that which is still turbid remaining below the upper cock. The purified oil being drawn off, that which is turbid is let out into a reservoir, where it either remains to clarify by subsidence, or is mixed with the next portion of raw oil.